

# The 1891 Gairloch Bridge

## A bridge designed to be submerged

### A bridge is needed

The Herbert River valley was occupied by pastoralists in the mid-1860s. Sugar cane farming commenced during the early 1870s. By the late 1880s, the Ingham area had become one of Queensland's top sugar producers with some five mills operating in the Herbert River district.

In 1885, the Hinchinbrook Divisional Board and residents of the area petitioned the Government to construct a bridge across the Herbert River, to improve access for growers north of the river to the region's seaport south of the river at Dungeness. Unsuccessful in this approach, the Board decided to raise the finance itself, and in June 1888 asked the government Engineer for Bridges to prepare plans for the bridge.

The Gairloch Bridge was the first road bridge designed by Alfred Barton Brady. An English-born civil engineer and architect, Brady migrated to Australia in 1884 and held various positions in the Government until his retirement in 1922.

### The bridge is built

Contractor James Graham commenced construction early in 1890. Following a number of delays, due partly to frequent flooding of the river, the bridge was completed at a cost of £7737 and opened for traffic on 4 November 1891. The original bridge was 481 ft 3 in (147 m) long with a clear width 16 ft (4.8 m).



The Bridge in the early 1900s (photos courtesy of Hinchinbrook Shire Library)

### Design concepts

The Gairloch Bridge incorporated a number of features that were innovative at the time. For the decking, Brady used 33 ft (10 m) lengths of mild steel trough plate, 12 in (30 cm) deep, riveted together and securely bolted down to the concrete string-courses on the piers and abutments. The troughs were the structural component of the deck spanning longitudinally between the concrete piers. The trough form of superstructure possesses many advantages for short spans, as girders may be entirely dispensed with, and in the case of low-level bridges, the small depth of the troughs offers but little resistance to the passage of flood waters during wet seasons. This is the first known use of such a system in Australia. The troughs were then filled with tarred metal. The kerbs and posts were of hardwood. This design was more costly than a bridge using timber decking and superstructure, but Brady argued the maintenance costs would be less.

### Why this bridge is important

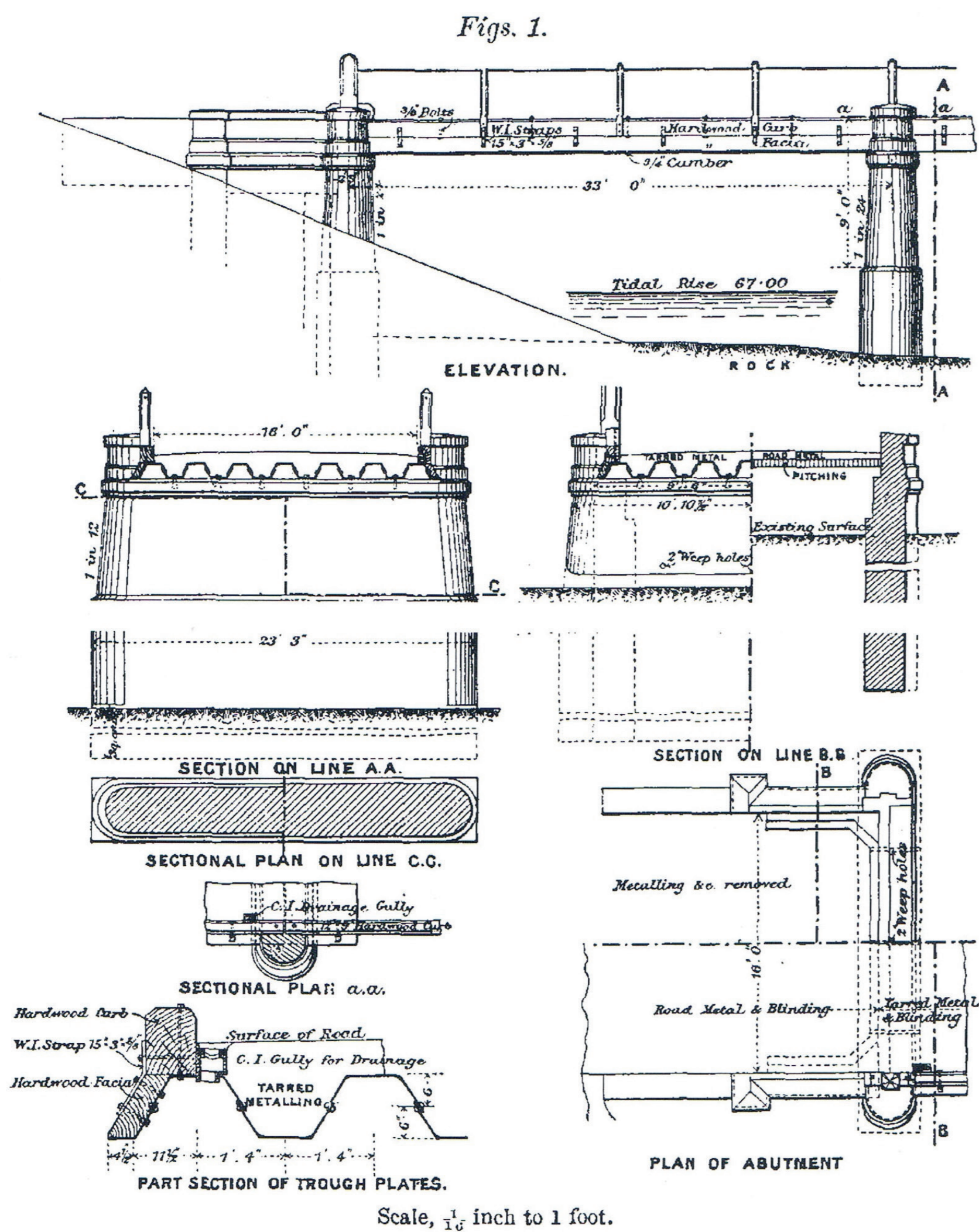
The Gairloch Bridge is a submersible bridge designed to withstand inundation during major floods, the first such road bridge known to have been designed by Brady. Shorter, low level submersible bridges were a cost-effective alternative to bridges constructed above major flood levels. Brady's design presented the least possible obstruction to the flow of flood waters and the debris they carry.

The design is also innovative for its early use of Portland cement concrete in the piers, abutments and string courses. In 1894 Portland cement concrete replaced the original asphalt filling of the steel troughs providing improved resistance to degradation under flooding. This use of concrete as an integral part of the deck represented an early form of composite construction which is the earliest type of this form of construction in Australia.

Gairloch Bridge is the only known road bridge of this design built in the 19<sup>th</sup> century in Australia.



Gairloch Bridge pioneered Australian use of steel troughs to support the deck for bridges over rivers that flood (photo courtesy of Hinchinbrook Shire Council)



HERBERT RIVER BRIDGE, GAIRLOCH.

"Extract from ICE paper "Low-Level Bridges in Queensland" by Alfred Barton Brady published 1896"



www.engineersaustralia.org.au/heritageregister/search

Engineering Heritage Marker placed on 18 March 2014. Engineers Australia Queensland Division, Hinchinbrook Shire Council